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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a printed wired board and its manufacture approach.

[0002]

[Description of the Prior Art] Conventionally, the densification of a printed wired board is called for and the printed wired board which has more detailed SURUHORU and a beer hall is manufactured. There are processes of \*\*, such as a pattern formation process by a plating process [ by the perforation process by the drill, laser, etc., electroless deposition, electrolytic plating etc. ], liquefied photopolymer, and photosensitivity dry film etc. and a process which forms a solder resist, in manufacture of these printed wired boards. The design which forms a hole near the loading solder land of a printed wired board for carrying a semiconductor package like a CSP substrate (chip-size package) especially increases. It may occur that carry out printing spreading of the solder by forming a hole (SURUHORU, beer hall) more often near a detailed soldering land, the soldering lands which were high-density and crowded, and these soldering lands in mounting of the electronic parts to such a printed wired board, and carry electronic parts, the solder of a soldering land shifts to a hole when solder is fused, the solder of this soldering land is insufficient, and mounting becomes poor. Moreover, the electronic parts carried in order to raise the dependability of component mounting, and under-filling filled up with resin between printed wired boards are performed. Resin may flow into the hole of the printed wired board which exists under the electronic parts mounted by under-filling, and it may flow out of SURUHORU into a reverse side. For these reasons, even if printing spreading of the solder resist was carried out in the hole so that a conductor might be protected and a solder resist might not go into a hole in spreading of the solder resist to which the land of soldering is exposed selectively or, big air bubbles were included or the conductor of a hole was exposed selectively.

[0003]

[Problem(s) to be Solved by the Invention] The solder resist by which printing spreading was carried out by the conventional approach in the hole (SURUHORU, beer hall) contains big air bubbles. Moreover, in order for a front face to dry early and to harden after printing spreading, these air bubbles are covered by the thin film. The whole printed wired board is heated at the process which mounts electronic parts, and air bubbles may explode or it may be cracked. Thus, the air bubbles which exploded, and the cracked air bubbles have the problem and the damp-proof problem of incorporating solder and causing poor mounting at the time of electronic-parts loading.

[0004]

[Means for Solving the Problem] In the printed wired board in which this invention has the conductor layer of two or more layers, an insulating layer, and a hole, and its manufacture approach The hole which carried out opening on the surface of the printed wired board is made up for by the solder resist, and they are the printed wired board whose cellular size of the part of this hole is 100 micrometers or less (0 is not included), and its manufacture approach. Without a production process increasing by filling with this solder resist a hole (SURUHORU beer hall which carried out opening on the surface of the

printed wired board) at the time of pattern printing spreading of a solder resist The printed wired board which solved the problem which causes poor soldering at the time of mounting of electronic parts, the damp-proof problem, etc. is offered.

[0005] Hereafter, the printed wired board concerning this invention and its manufacture approach are explained in full detail. Drawing 1 is the sectional view of the printed wired board which exposed the soldering land by the solder resist, protected the conductor layer, and filled the hole.

[0006] The printed wired board concerning this invention, and its manufacture approach A solder resist at the process which carries out printing spreading to the printed wired board in which SURUHORU which does not limit the number of layers of a conductor layer and an insulating layer, and connects the conductor layer of two or more layers electrically, and a beer hall were formed the hole (SURUHORU, beer hall) which is carrying out opening to the front face -- or even if the hole near the soldering land is made up for by this solder resist at least and air bubbles exist few, cellular size is 100 micrometers or less (0 is not included).

[0007] For example, positioning installation of the printed wired board is carried out at the susceptor 10 of an airline printer, both-way printing of the printing paste 7-0 of a solder resist is carried out by the squeegees 8 and 9 the platemaking 11 in which the printing pattern was formed, and for printing, and the solder resist 7-2 which performed hardening processing and filled the solder-resist pattern 7-1 and the hole, and 7-3 are formed. Even if the interior of a beer hall 5 is uniformly filled up with a printing paste and air bubbles exist few by carrying out outward trip printing of the printing paste 7-0 by the squeegee 9, and carrying out return circuit printing of the printing paste 7-0 by the squeegee 8, cellular size is 100 micrometers or less. Moreover, even if the interior of SURUHORU 6 is filled up uniformly similarly and air bubbles exist few, cellular size is 100 micrometers or less.

[0008] Moreover, for example, although both-way printing by two squeegees was explained to the above, it screen-stencils using two mostly concurrent squeegees, and the interior of a beer hall 5 can be uniformly filled up with the printing paste 7-0, and can be uniformly filled up with it also inside SURUHORU 6.

[0009] filling up this hole with this printing paste by such screen-stencil approach, and hardening -- the conductor of this hole -- a part is covered with a solder resist and the cellular size of the solder resist with which it filled up is 100 micrometers or less (0 is not included). cellular size is 100 micrometers or less (0 is not included.) -- the burst of these air bubbles in solder melting temperature, and crack initiation -- there is nothing -- a conductor -- there is no shift of solder to a part, and it excels in moisture resistance. Preferably, cellular size is 50 micrometers or less (0 is not included.). Furthermore, it is 30 micrometers or less (0 is not included) preferably.

[0010] Moreover, the construction material of the squeegee used by the printed wired board and its manufacture approach and especially a configuration are not limited. As for the configuration of the squeegee printed first, it is desirable that whenever [ point-angle ] (include angle to which a squeegee touches a printed wired board) is 1 - 10 degrees, and it is desirable that the squeegee include angle which is whenever [ with a printed wired board / angle-of-inclination ] is 85 - 65 degrees. A printing paste is insufficient, a hole is not full of this printing paste, welding pressure is insufficient at an include angle smaller than 65 degrees, and a printing paste is not [ include angle / than 85 degrees / larger ] full of a hole. A squeegee include angle is 80 - 70 degrees more preferably. Moreover, as for the squeegee include angle of the squeegee printed to the 2nd, it is desirable that it is 85 - 65 degrees. A printing paste is insufficient, and this paste is not filled with a bigger include angle than 85 degrees in a hole, but peeling of a solder resist to which the thickness of a printing paste becomes thick tends to take place at an include angle smaller than 65 degrees with it. A squeegee include angle is 80 - 70 degrees more preferably.

[0011] Moreover, in order to fill up a hole with the presswork of a solder resist simultaneously, excessive processes (a new restoration process, polish process, etc.) are unnecessary.

[0012] Moreover, thermosetting, photoresists, these mixing, etc. are sufficient as the printing paste for solder resists, and it is not limited especially. If it is the approach of screen-stenciling a thermosetting printing paste, there are few processes only by printing and heat-hardening by the desired pattern, and it

is desirable. It becomes [ a fine pattern ] still more possible and is desirable by filling up a hole with the approach of screen-stenciling a printing paste including a photoresist and thermosetting, applying to a front face mostly, carrying out exposure hardening using a mask (carrying out exposure hardening with laser), developing negatives, and carrying out heat curing. Moreover, while filling up a hole with the approach of screen-stenciling a printing paste including a photoresist and thermosetting, it is desirable to print the pattern of a solder resist and to also make it harden only according to heat curing.

[0013] Even if there are few air bubbles which the hole (SURUHORU, beer hall) is filled up with the solder resist, and are inherent in this solder resist of this hole and the printed wired board concerning this invention and the printed wired board of the manufacture approach exist, cellular size is 100 micrometers or less, and moisture resistance is also good [ size ], without incorporating solder and causing poor mounting at the time of electronic-parts loading.

[0014]

[Example] Hereafter, the example of the printed wired board concerning this invention and its manufacture approach is explained. In addition, the printed wired board concerning this invention and its manufacture approach are not restricted to the following examples.

[0015] (Example 1) printed wired board 1[manufactured by the laminating technique currently generally performed -- beer hall 5, SURUHORU 6, etc. formed by the inner layer conductor layer 3, the insulating layer 2, the outer layer conductor layer 4 in which the circuit pattern was formed, the drill, or laser are formed.] Carry out set immobilization on the susceptor 10 of both-way screen-stencil equipment, and the printing paste (PSR-4000 AUS5: Taiyo Ink Mfg. make) 7-0 is arranged after platemaking (they are 100 meshes with polyester) 11. It is application-of-pressure migration (the squeegee 8 has bounded on the left from the right of drawing 2 .) at a squeegee 9 (whenever [ point-angle ] 75 squeegee include angles, 5 times). It carried out, and this printing paste was printed and applied in the front face of this printed wired board 1, this SURUHORU 6, and this beer hall 5. Then, this squeegee 9 was bounded, application-of-pressure migration of raising and this printing paste 7-0 was carried out from the left of drawing 2 by the squeegee 8 (75 squeegee include angles) on the right, and this printing paste 7-0 was printed and applied in the front face of this printed wired board 1, this beer hall 5, and this SURUHORU 6.

[0016] As for the printed wired board which spreading of a printing paste ended, heat curing for 30 minutes was made at the desiccation for 20 minutes, and 150 degrees 80 degrees. Making up for the hole which carries out opening to a front face at the above processes by the solder resist, the printed wired board to which the field where a conductor is soldered was excluded and the solder resist was applied was manufactured. Thus, the cellular size which there are few air bubbles when the printed wired board by which both-way screen-stencil was carried out is observed in microsectioning, there are no big air bubbles, and exists was 20 micrometers or less. Moreover, air bubbles are not exploded and cracked even if it heats to solder melting temperature in soldering of electronic parts. For this reason, solder did not shift in this hole at the time of loading of electronic parts, it was good mounting, without solder adhering to a hole, and moisture resistance was also good.

[0017] (Example 2) Beer hall 5 and the SURUHORU 6 grade formed by the printed wired board [inner layer conductor layer 3 manufactured by the laminating technique currently generally performed, the insulating layer 2, the outer layer conductor layer 4 in which the circuit pattern was formed, the drill, or laser are formed.] Carry out set immobilization on the susceptor of screen-stencil equipment, and the printing paste (PSR-4000 AUS5: Taiyo Ink Mfg. make) by thermosetting resin is arranged after platemaking (100 meshes of polyester). Press fit spreading is carried out into the inside of the this beer hall 5 which carries out application-of-pressure migration by the first squeegee 9 (whenever [ point-angle ] 75 squeegee include angles, 5 times), and is carrying out opening of this printing paste to the front face of this printed wired board, and this SURUHORU 6. This printing paste was softly applied to this beer hall 5 and this SURUHORU 6 by the second squeegee 8 (75 squeegee include angles) which carries out simultaneous migration in parallel mostly. The solder field of a conductor was excluded simultaneously, this printing paste was applied, and it became a solder resist.

[0018] As for the printed wired board which spreading of a printing paste ended, heat curing for 30

minutes was made at the desiccation for 20 minutes, and 150 degrees 80 degrees. The hole which carries out opening to a front face as mentioned above was made up for by solder resist, and the printed wired board by which the solder resist pattern was formed in the front face was manufactured. When microsectioning observation of the part of a hole was carried out, the cellular size in which air bubbles exist few was 30 micrometers or less. Moreover, solder did not shift in this hole at the time of loading of electronic parts, it was good mounting, and moisture resistance was also good.

[0019]

[Effect of the Invention] By making up for holes which carried out opening to the front face of this printed wired board, such as SURUHORU and a beer hall, by the solder resist, in mounting of electronic parts, when solder is applied and solder is fused, the solder of a soldering land shifts to a hole, and the solder of this soldering land is insufficient for the printed wired board concerning this invention, and the printed wired board by the manufacture approach, and they do not cause poor mounting. Moreover, moisture resistance is good. Moreover, it is possible at the process conventional only by screen-stenciling without increasing a new process.

[0020]

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## CLAIMS

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[Claim(s)]

[Claim 1] The printed wired board which the hole which carried out opening on the surface of the printed wired board is made up for by the solder resist in the printed wired board which has the conductor layer of two or more layers, an insulating layer, and a hole, and its manufacture approach, and is characterized by the cellular size of the part of this hole being 100 micrometers or less (0 not being included), and its manufacture approach.

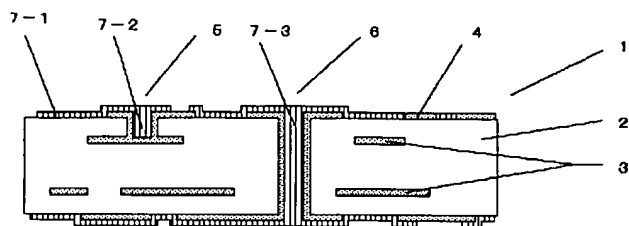
[Claim 2] The printed wired board according to claim 1 characterized by filling a gap by the screen-stencil approach by two squeegees, and its manufacture approach.

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[Translation done.]

Drawing selection Representative drawing

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